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A NEW FLIGHTLESS MONTANE SPECIES OF *LACHNOPHOROIDES* DISTANT (HETEROPTERA : LYGAEIDAE) FROM NORTH QUEENSLAND

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ABSTRACT

Lachnophoroides frerei sp. nov., a brachypterous, flightless species from high altitudes on Mt Bartle Frere, North Queensland, is described and compared with its macropterous sister-species, *L. thompsoni* Woodward. A pair of fossae on the fourth abdominal sternum of the male of both species appears not to have been recorded from any other genus of Lygaeidae. The third and fourth nymphal instars of *L. frerei* are described. Additional morphological and distributional data are given for *L. thompsoni*.

INTRODUCTION

Lachnophoroides Distant (Rhyparochrominae : Targaremini) has 3 species described from New Caledonia and 1 species from Queensland, all known only in the macropterous form (Woodward 1977). Dr G.B. Monteith organised and led collecting expeditions by an Earthwatch team and staff of the Queensland Museum, on Bellenden Ker Range, north Queensland, and nearby areas. Among many other species of lygaeids, mostly new records for this region, are 4 flightless, brachypterous specimens of *Lachnophoroides* from altitudes of 1440–1620 m on Mt Bartle Frere. In most external features, except those commonly associated with brachyptery, these specimens are very similar to the eastern Queensland species, *L. thompsoni* Woodward. Their dissection, however, reveals several differences in genitalia and other abdominal structures. They are thus considered to represent a new species, described below, and to be the sister group of *L. thompsoni*, adapted to wet, high altitude conditions. Specimens of *L. thompsoni* were also collected by this expedition in the Bellenden Ker region but at much lower altitudes.

'Pyrethrum knockdown' refers to collections made after spraying with a pyrethrum extract and Dr Monteith informs me that on the summit of Mt Bartle Frere it applies to knockdown from logs or tree trunks.

† Tom Woodward died on 22 November 1985.

Abbreviations: QM = Queensland Museum, Brisbane; UQ = University of Queensland Insect Collection, Brisbane.

In the following accounts all measurements are in millimetres.

Lachnophoroides thompsoni Woodward
(Figs 4, 8; Plate 1, Fig. 1)

Lachnophoroides thompsoni Woodward, 1977, p. 64.

MATERIAL EXAMINED

[Additional to that listed by Woodward (1977)]

Queensland: 1 ♂, Herberton, 17.vi.1971, coll. G.B Monteith (UQ); 1 ♂, 2 ♀, Russell R. at Bellenden Ker Landing, 5 m, 1-9.xi.1981, Earthwatch/Qld Mus. (QM); 1 ♀, same data, Q.M. Berlesate No. 361, 17°16S, 145°57E, palm swamp, moss on tree trunks (QM); 1 ♀, Bellenden Ker Range, Cableway Base Stn, 100 m, 17.x.-9.xi.1981, Earthwatch/Qld Museum, 'pyrethrum knockdown' (QM), 1 ♀, Bellenden Ker Range, 1 km S. of Cable Tower 6, 17.x.-5.xi.1981, 500 m, Earthwatch/Qld Museum: 1 ♂, same data plus 'pyrethrum knockdown' (QM); 1 ♀, Emerald Ck, Lamb Range, 11.x.1982, 950 m, coll. G. Monteith, D. Yeates, G. Thompson, pyrethrum knockdown, RF [rainforest] (QM).

VARIATION

One ♂ and 1 ♀ from the Bellenden Ker region are a little longer than any specimens previously examined (total body length 4.0). However, all other measurements fall within the ranges noted by Woodward (1977). The female from Lamb Range has the right antenna oligomerous; length of segments I 0.44, II 0.79, III 0.79.

DISTRIBUTION

This species is now known from coastal southeast Queensland and from northeast Queensland from near sea level to 950 m altitude.

Lachnophoroides frerei sp. nov.
(Figs. 1–3, 5–7, 9, 10; Plate 1, Fig. 2)

MATERIAL EXAMINED

HOLOTYPE♂, T8883, 1 PARATYPE♀, T8884, Mt Bartle Frere, South Peak Summit, 1620 m, 6–8.xi.1981, Earthwatch/Qld Museum, pyrethrum knockdown (QM); 1 PARATYPE♂, T8886, 1 3rd instar, 2 4th instar nymphs, Mt Bartle Frere, summit creek, 24.ix.1981, coll. G. Monteith and D. Cook, QM Berlesate No. 304, rainforest, 1500 m, sieved litter (QM); 1 PARATYPE♀, T8885, Mt Bartle Frere, NW Peak, 1440 m, pyrethrum on mossy rocks, 24.ix.1981, coll. G. Monteith (QM).

DESCRIPTION

Measurements of holotype given first.

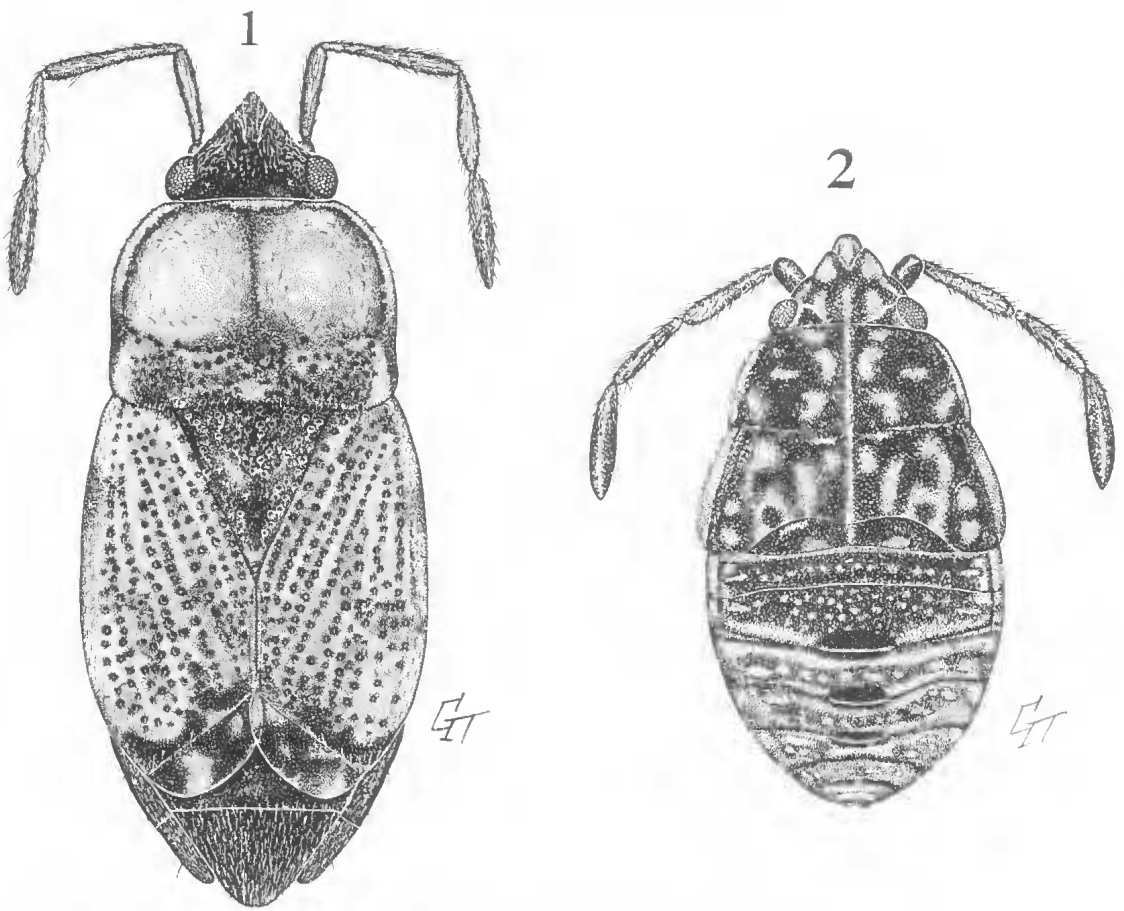
COLORATION: Head reddish brown, ventrally between eyes red, anteclypeus and paraclypei yellowish to reddish brown. Eyes dark reddish brown. Antennal segments I–III yellowish to reddish brown, IV more or less fuscous brown. Labial segments yellowish brown, IV brownish black except at apex. Pronotum with anterior lobe yellowish brown or orange-brown with a thin dark median stripe; posterior lobe marked with yellowish brown and dark brown; anterior collar-like area and lateral carinae, at least anteriorly, yellow, former reddish brown laterally; punctures, extreme lateral margins of carinae, and a small lateral patch before posterolateral angles, dark brown. Scutellum reddish brown with a dark median area posteriorly; apex and posterior part of lateral margins creamish yellow. Corium brown with off-white streaks and patches; apical margin mostly black. Punctures of scutellum and corium dark brown. Membrane brown with two or three pale streaks. Ventrolateral surface of thorax blackish brown; dorsal margin, supracoxal areas, anterior part of prothorax and metapleural evaporative area lighter brown; scent-gland peritreme dark brown. Legs yellowish brown; coxae reddish brown. Abdomen with ventral surface reddish brown, dorsal surface red or reddish brown.

Body length 3.7 (♂ 3.7, ♀ 3.9); maximum width 1.45 (♂ 1.45, ♀ 1.76).

HEAD: Structure similar to that of *L. thompsoni*, except ocelli vestigial and eyes relatively smaller than interocular space 3.5–3.6 x eye width in ♂, 3.8–3.9 x in ♀ (♂, ♀ 2.3–3.0 x in *L. thompsoni*). Width across eyes 0.81 (♂ 0.82, ♀ 0.82–0.87); interocular space 0.52 (♂ 0.52, ♀ 0.54–0.57); length 0.71. Length antennal segments I 0.46 (0.46), II 0.71 (♂ 0.65, ♀ 0.68–0.71), III 0.56 (♂ 0.54, ♀ 0.56), IV 0.57 (♂ 0.56, ♀ 0.56–0.59). Length labial segments I 0.63 (♂ 0.62, ♀ 0.62–0.63), II 0.63 (♂ 0.62, ♀ 0.62–0.63), III 0.38 (♂ 0.37, ♀ 0.40), IV 0.35 (♂ 0.33, ♀ 0.34).

THORAX: Pronotum similar to that of *L. thompsoni*, except lateral carinae narrower, only 2/3 maximum width of antennal segment I, and posterior lobe relatively shorter, with median length about 1/3 that of anterior lobe excluding anterior collar in ♂, about 1/2 in ♀ (in *L. thompsoni* about 1/2 in ♂, about 2/3 in ♀). Median length of pronotum 0.97 (♂ 0.97, ♀ 0.89–0.94); posterior width 1.35 (♂ 1.35, ♀ 1.35–1.51). Scutellum: length 0.83 (♂ 0.79, ♀ 0.86–0.89); anterior width 0.71 (♂ 0.71, ♀ 0.71–0.76). Hemelytron coleopteroid (*sensu* Slater 1975, p. 53), differing from that of *L. thompsoni* as follows: clavus completely fused with corium, with no trace of claval suture; in claval area, punctures of each of second and third rows and of basal half of first row (nearest scutellum) mostly not contiguous, but about 1–3 puncture-widths apart, only 13–17 punctures in third row; distance between apex of scutellum to apex of anal margin of corium 0.62 (♂ 0.59; ♀ 0.65–0.71), much longer than claval commissure of *L. thompsoni*; membranes reduced to opaque, almost semicircular areas, very slightly overlapping, reaching to about anterior margin of abdominal tergum VI in mid-line and posterior quarter of this tergum distally. Hind wings reduced to small triangular flaps not extending beyond metanotum (fully developed in *L. thompsoni*). Ventral surface of thorax and spination of fore femur as in *L. thompsoni*. Ventral surface of fore tibia of ♂ with numerous denticles throughout length, larger than in *L. thompsoni*.

ABDOMEN: Submedian trichobothria and trichobothrial areas of sterna III and IV much reduced and inconspicuous compared with those of *L. thompsoni*, on sternum III arranged in 2 triangular series, on sternum IV in 2 transverse linear series (all triangularly arranged in *L. thompsoni* (Plate 1, Fig. 1)). As in *L. thompsoni*, spiracle of sternum IV situated very close to dorsolateral margin, and middle trichobothrium of sterna V closer to posterior than to anterior trichobothrium. MALE: Sternum IV, behind the 2 trichobothrial areas, with a pair of ovoid fossae each with a tuft of setae and with anterior margin raised into a thickened black rim (Plate 1, Fig. 2) (similar fossae present in ♂ of *L. thompsoni* but

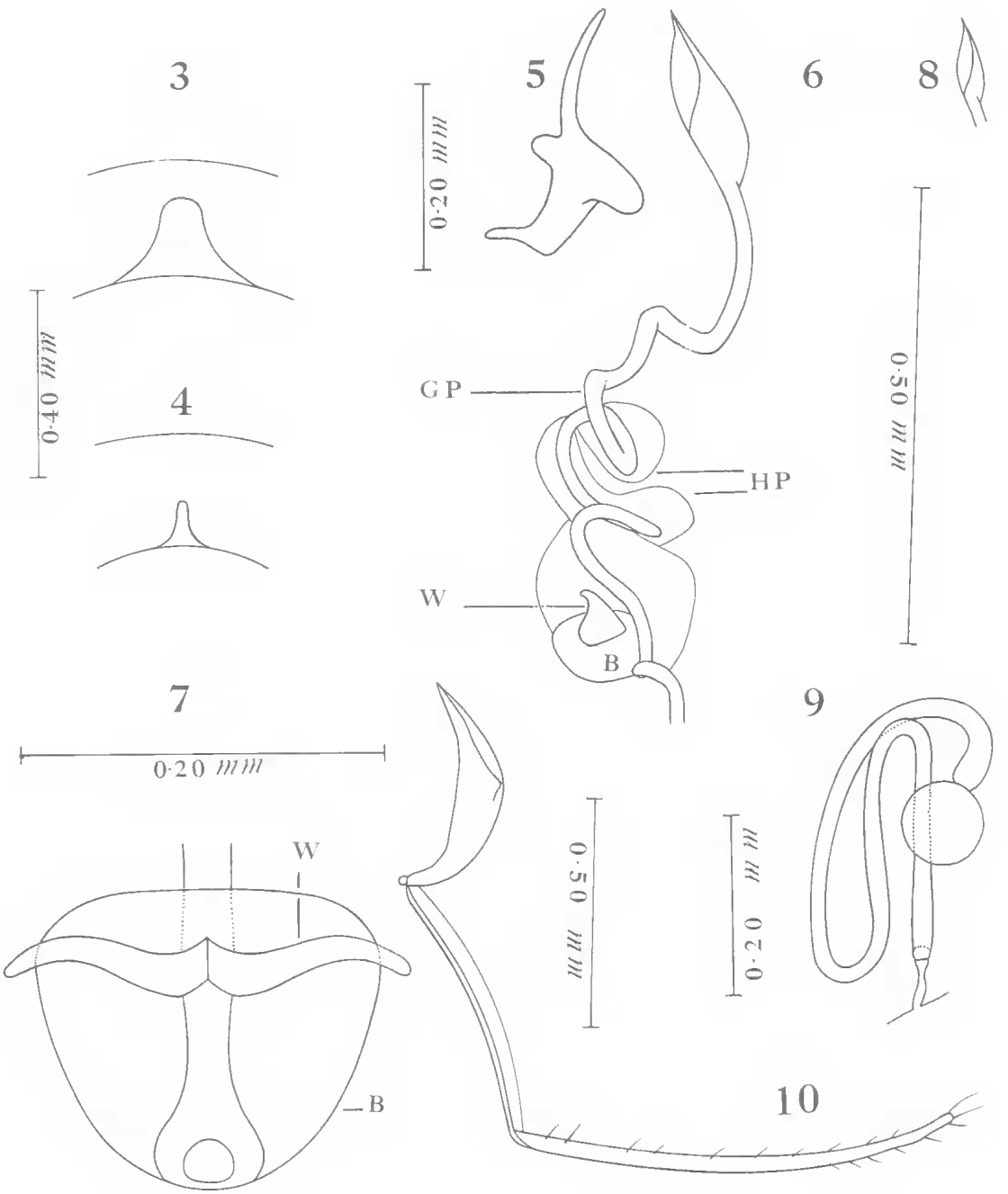


FIGS 1, 2: *Lachnophoroides frerei*, dorsal aspect. 1, paratype male; 2, nymph, 4th instar.

anterior rim much less developed (Plate 1, Fig. 1); sterna V, VI and VII on each side with an extensive area of fine pores, less numerous and less close-set than in *L. thompsoni*. Median apodeme from anterior margin of sternum 7 (Fig. 3) much wider than in *L. thompsoni* (Fig. 4). Parameres (Fig. 5) with smaller process more broadly rounded and larger than in *L. thompsoni* (Woodward 1977, Fig. 4). Aedeagus (Fig. 6) resembling that of *L. thompsoni* in having wings of ejaculatory reservoir large, curved, with bases set close together (Fig. 7); helicoid process with 2 coils; gonoporal process distal to helicoid process not enclosed in a prominent inflatable lobe, with 2 turns, distal end widened, then tapered to a fine, acute termination; differing from that of *L. thompsoni* (Fig. 8) in distal portion of gonoporal process being larger and broader. FEMALE: Paired setose fossae of sternum IV and pore areas of sterna V–VII lacking (absent also in ♀ of *L. thompsoni*). Genitalia similar to those of *L. thompsoni:* spermatheca (Fig. 9) with short, narrow proimal and long, wide distal divisions of duct, latter with 2 loops, and with a well developed spherical bulb; ovipositor: gonapophysis I with ramus extending to about distal 1/5; apex of gonapophysis II narrowly rounded and slightly curved, with 2 long distal setae (Fig. 10).

COMMENTS

The female from South Peak Summit is somewhat teneral, with rather crumpled hemelytral membranes and a paler body, the pronotum having the anterior collar, lateral carinae and posterior lobe mostly creamish white, the scutellum being extensively white, the corium mostly off-white with a few light brown streaks, and the abdomen ventrally mostly yellowish brown and dorsally streaked with red and yellow.



FIGS 3–10: *Lachnophoroides* spp. 3, 4, median apodeme from anterior margin of abdominal sternum 7 of male: 3, *L. frerei*, holotype; 4, *L. thompsoni*, paratype. 5–7, male genitalia, *L. frerei*, holotype: 5, right paramere, dorsal aspect; 6, ejaculatory reservoir and vesica of aedeagus, lateral aspect; 7, ejaculatory reservoir, dorsal aspect. 8, distal end of gonoporal process of *L. thompsoni*, paratype. 9, 10, female genitalia of *L. frerei*, paratype: 9, spermatheca; 10, gonapophysis II. **B**, body; **GP**, gonoporal process; **HP**, helicoid process; **W**, wing.

DISCUSSION

As noted above, *L. frerei* is considered to be the montane sister species of *L. thompsoni*. The specific differences, apart from those commonly associated with degree of wing development (size of the eyes and ocelli, slight differences in the structure of the pronotum, and possibly the different punctation of the clavus), are those of colour and the differences in abdominal structures already described.

G.B. Monteith (pers. comm.) has pointed out that it is significant that *L. frerei* was not taken on Mt. Bellenden Ker, a larger massif than Bartle Frere, of comparable height (1560 m) and only 10 km distant, despite much more intensive sampling there by the Earthwatch party than on Bartle Frere. He also drew attention to the paper by Covacevich (1984) describing the lizard *Leiolopisma jigurru*, also restricted to Bartle Frere, and discussing the distribution of this and other animal taxa.

The setiferous fossae of sternum IV of the male, so far as the author is aware, have not been recorded in any other genus of Lygaeidae. The abdomen of the male paratype of *L. frerei* was immersed overnight in cold 10% KOH solution. Upon separation of the sternal region, two bulky, subglobular and contiguous tissue masses became apparent, each overlying and closely attached to the internal wall of each fossa and about 0.32 mm in diameter. These appear to be a pair of compound glands, evidently ectodermal since their intima, although thin, remained intact after KOH treatment and because, scattered near the surface of each mass, were small black capsules, apparently the sclerotised and heavily pigmented thecae of the component glands. Similar structures occur in males of *L. thompsoni*. Their restriction to males suggests the secretion of a sex pheromone, dispersed by the long setae of the fossae; this possibility is to be tested.

NYMPHS OF *L. FREREI*

Nymphs of this species resemble those of *L. thompsoni* in the characters given by Woodward (1977, p.66) distinguishing the latter from nymphs of other Australian Targaremini, except for two features linked with adult brachyptery: the greater interocular space : eye width ratio and the very reduced eyes of the third instar specimen being remote from the pronotum. Those of the 2 fourth instar specimens reach or nearly reach the pronotum, as in *L. thompsoni*.

Other similarities between the nymphs of the two species are the red eyes and the brown thoracic pleura and abdominal scent gland areas.

Nymphs of *L. frerei* are readily distinguished from those of *L. thompsoni* by the much more variegated colour pattern of the head and thorax, the smaller eyes, the shorter antennal segment 1 and the proportionally shorter pronotum.

THIRD INSTAR

Body length 2.1; abdominal width 1.0.

COLORATION: Dorsal surface of head and thorax variegated in yellow and brown. Head with epicranial suture, paraclypei, anteclypeus, and most of median part of crown anterior to epicranial suture yellow; the following brown: junctions of anteclypeus and paraclypei (very narrow suture lines anteriorly, broader bands posteriorly), 2 longitudinal bands on crown between epicranial suture and anteclypeus forming an irregular inverted Y with short anterior stem, lateral margins of paraclypei, and vertex behind arms of epicranial suture. Ventral surface of head brown; ventral ecdysial lines and base in middle yellow; red anteromedially. Antennifers brown with red tinges; antennae brown. Labial segments I–III yellowish brown; IV brown. Thorax above with yellow median ecdysial line bordered by 2 irregular longitudinal brown bands. Pronotum with 6 irregular yellow patches: 2 anterior submedian and 4 smaller posterior, 2 submedian, 2 sublateral; lateral carinae yellowish brown; remainder brown. Mesonotum with the following yellow: median ecdysial line (wider than on pronotum), 2 small submedian spots near anterior 1/3, more laterally 2 broad oblique bands in posterior 2/3, and 2 irregular sublateral bands; lateral carinae yellowish brown; remainder brown. Metanotum yellowish brown with reddish tinges, especially posteriorly and on lateral carinae; most of anterior margin and inner and outer margins of carinae brown. Thoracic pleura brown, brownish red posteriorly; ventral surface of thorax yellow. Legs brown, with distal ends of femora, proximal and distal ends of tibiae, and basitarsi, except at extreme proximal end, pale yellow. Abdominal terga I–III mostly brown, with small yellow spots and a yellow band along posterior margin of III on each side of first scent gland area; tergum IV yellow with broken transverse brown band; tergum V similar to IV in median 1/2, lateral parts mainly brown; VI and VII, behind third scent gland area, narrowly yellow with a transverse brown band, laterally brown with

obscure yellow markings; VIII yellow in middle, brown laterally, IX yellow; proctiger ringed with dark brown; Y-suture and intertergal sutures red. Venter of abdomen reddish brown, with a small brown median sclerite on each segment.

HEAD: Length 0.52; width across eye 0.56; interocular space 0.36; eyes remote from anterolateral pronotal angles (eye length 0.13, postocular length 0.08). Length of antennal segments I 0.17, II 0.30, III 0.25, IV 0.35; segment I with only about distal 1/4 surpassing apex of head. Frontal sutures gradually curved. Length of labial segment I 0.35, II 0.32, III 0.25, IV 0.27; I reaching to behind level of posterior margins of eyes.

THORAX: Pronotum: median length 0.33; posterior width 0.79. Mesonotum: median length 0.24; posterior margin nearly straight; wing pads not developed.

ABDOMEN: Anterior scent gland area wider than second and third, these subequal in width.

FOURTH INSTAR (Fig. 2)

Body length 2.4; abdominal width 1.2.

COLORATION: Similar to that of third except: head with a discrete brown bar near anteromesial border of each eye; antennal segment II paler at distal end; pro- and mesonotal carinae mostly yellow, former brown anteriorly and near inner margin, latter extensively so posteriorly and diffusely so anteriorly; wing buds mottled with brown and yellow; visible part of metanotum brown except for pale ecdysial line and an off-yellow spot on each side of it.

HEAD: Length 0.52; width across eyes 0.52; 0.56; interocular space 0.40; eyes touching or close to anterolateral pronotal angles; eye length 0.16; length of antennal segments I 0.24, II 0.41, III 0.38, IV 0.56; segment I with about distal 1/3 surpassing apex of head. Frontal sutures angled well before reaching eyes. Length of labial segments I 0.41, II 0.37, III 0.33, IV 0.29; I reaching to about level of posterior margins of eyes.

THORAX: Pronotum: median length 0.43; posterior width 0.90, 0.97. Mesonotum: median length 0.25, 0.30; posterior margin between wings pads slightly convex; wing pads reaching posterior margin of mesonotum, length 0.44, 0.51.

ABDOMEN: Scent gland areas similar in relative width to those of third instar.

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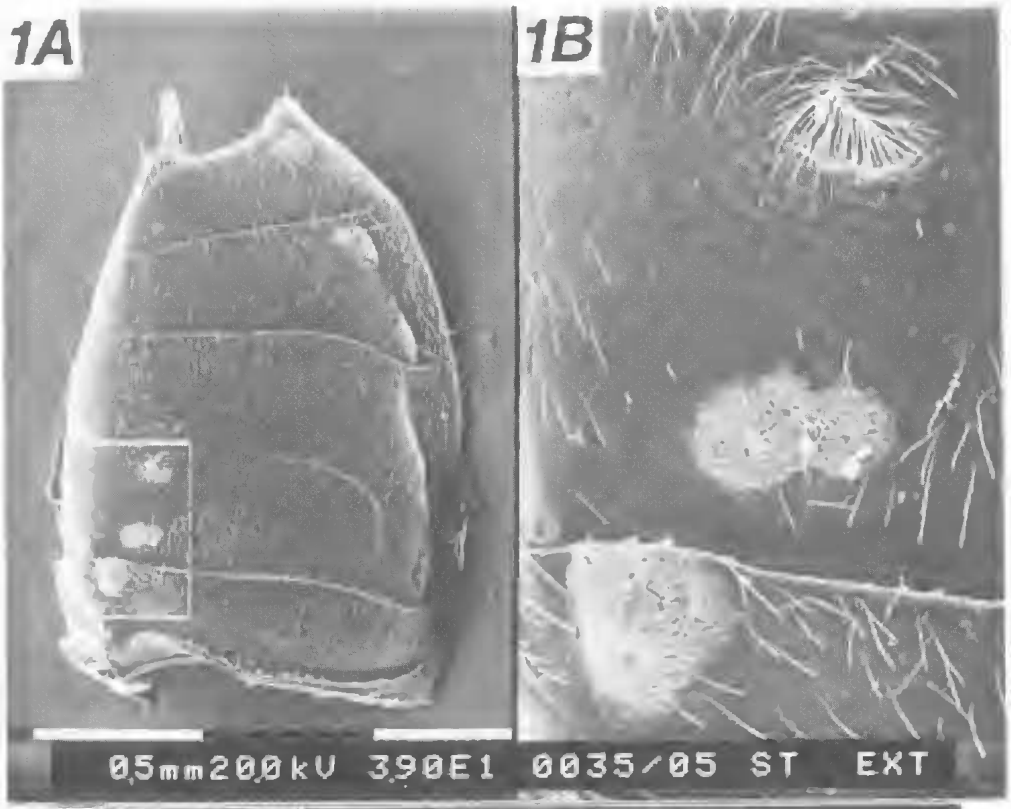
PLATE 1

FIG. 1: *Lachnophoroides thompsoni*, paratype male. A, external ventrolateral aspect of abdomen, anterior margin at bottom of figure; rectangle includes right trichobothrial area of sternum 3 and right trichobothrial area and right setose fossa of sternum 4. B, enlarged view of rectangle.

FIG. 2: *Lachnophoroides frerei*, paratype male: one of the pair of setose fossae of abdominal sternum 4.


1A
1B
0,5mm20,0kV 3,90E1 0035/05 ST EXT


2
0,1mm20,0kV 6,25E2 0049/05 ST4 EXT